--CLAIMS--

1. Apparatus comprising a motor having a stationary member and a submersible rotatable drive member, bearing means for supporting said rotatable drive member, and a submersible rotatable processing component carried by said rotatable drive member, said bearing means controlling axial and radial movement of said rotatable drive member relative to said stationary member.

2. Apparatus as recited in claim 1 wherein said motor is a variable speed switched reluctance motor.

3. Apparatus as recited in claim 1 wherein said bearing means comprise magnetic bearings.

4. Paper pulp processing apparatus comprising a motor having a stationary member and a rotatable drive member, a rotatable pulp processing component carried by said rotatable drive member, and bearings supporting said rotatable drive member and said rotatable pulp processing component, said bearings controlling axial and radial movement of said rotatable drive member relative to said stationary member.

5. Paper pulp processing apparatus as recited in claim 4 wherein said motor is a variable speed motor and wherein said bearing means comprise magnetic bearings.

6. Paper pulp processing apparatus as recited in claim 5 wherein said stationary member is disposed along a longitudinal axis within said rotatable drive member, said rotatable pulp processing component being a screen cylinder.

7. Paper pulp processing apparatus comprising a variable speed motor having a stator and a rotor rotatably disposed along a longitudinal axis within said stator, a rotatable pulp processing component carried by said rotor, and magnetic bearings supporting said rotor and said rotatable pulp processing component and

controlling axial and radial movement of said rotatable pulp processing component relative to said stator.

8. A paper pulp processing apparatus as recited in claim 7 further comprising a hollow rotor and hollow shafted rotatable pulp processing component for feeding paper pulp suspension through both said rotor and rotatable pulp processing component.

9. A paper pulp processing apparatus as recited in claim 8 wherein said variable speed motor is a switched reluctance motor.

10. A paper pulp processing apparatus as recited in claim 9 wherein said rotatable pulp processing component comprises a refiner disk and wherein said paper pulp apparatus is a disk refiner.

11. A paper pulp processing apparatus as recited in claim 10 wherein said rotatable pulp processing component comprises a fluid foil and wherein said paper pulp apparatus is a screen cylinder.

12. A paper pulp processing apparatus a recited in claim 9 wherein said rotatable pulp processing component is a rotatable screen cylinder.

13. A paper pulp apparatus as recited in claim 7 wherein said rotor and said rotatable pulp processing component are integral.

14. A paper pulp apparatus as recited in claim 7 wherein said magnetic bearings comprise a first set of magnetic bearings to control radial position of said rotor and said rotatable pulp processing component relative to said stator and a second set of magnetic bearings to control axial position of said rotor and said rotatable pulp processing component along said longitudinal axis.

15. A paper pulp processing apparatus as recited in claim 7 wherein a portion of said rotor comprises an inclined surface positioned adjacent an inclined surface of said stator, said magnetic bearings positioned along said inclined surfaces and controlling both axial and radial positioning of said rotor and said rotatable pulp processing component relative to said stator.

16. A disk refiner comprising a switched reluctance motor comprising a stator and a rotor rotatably disposed along a longitudinal axis within said stator, said rotor carrying a refiner plate, a second refiner plate positioned along said longitudinal axis and adjacent said first refiner plate, and magnetic bearings operatively associated with said stator and rotor for supporting said rotor.

17. A disk refiner as recited in claim 16 wherein said first refiner plate comprises an opening therein and wherein said rotor comprises a hollow shaft communicating with said opening in said first refiner plate to define a fluid flow input for feeding a pulp suspension between said first and second refiner plates.

18. A disk refiner as recited in claim 16 comprising an end plate adjacent said stator and rotor and having said second refiner plate mounted thereon, said disk refiner further comprising linear movement actuator means for selectively moving said second refiner plate along said longitudinal axis toward and away from said first refiner plate.

19. A disk refiner as recited in claim 16 wherein said first refiner plate is attached to said rotor at a first end surface of said rotor, said first end surface of said rotor positioned within a first end of said stator along a first end surface of said stator, said first end surface of said rotor and said first end surface of said stator, together presenting a pair of inclined surfaces, and wherein said magnetic bearings are positioned along said inclined surfaces for controlling axial and radial positioning of said rotor within said stator.

20. A disk refiner comprising a switched reluctance motor comprising a stator and a rotor rotatably disposed along a longitudinal axis within said stator, said rotor having a first end carrying a first refiner plate and a second end carrying a second refiner plate, a first end plate spaced axially from said first refiner plate and a second end plate spaced axially from said second refiner plate with said first and second end plates and said stator defining an enclosed housing, a third refiner plate mounted on said first end plate and axially spaced from said first refiner plate, a fourth refiner plate mounted on said second end plate and axially spaced from said second refiner plate, and magnetic bearings operatively associated with said stator and rotor for levitatingly supporting said rotor with said stator.

21. A disk refiner as recited in claim 20 wherein said first end plate, second refiner plate and first refiner plate comprise openings therein, said rotor comprising a hollow shaft in communication with said openings in said first and second refiner plates and said first end plate to define a fluid flow input for feeding a pulp suspension between said first and third refiner plates and between said second and fourth refiner plates.

22. A disk refiner as recited in claim 20 further comprising a first linear actuator means for selectively moving said third refiner plate along said longitudinal axis toward and away from said first refiner plate and a second linear actuator means for selectively moving said fourth refiner plate along said longitudinal axis toward and away from said second refiner plate.

23. A disk refiner as recited in claim 20 wherein said first end of said rotor borders said stator along a first inclined surface and wherein said second end of said rotor borders said stator along a second inclined surface and wherein said magnetic bearings are positioned along both said first and second inclined surfaces to control axial and radial positioning of said rotor within said stator.

24. A screen for screening a flow of papermaker's stock comprising a switched reluctance motor having a stator and a rotor rotatably disposed along a longitudinal axis within said stator, a screen adjacent said stator and having an accepts surface and a fluid inlet surface, a housing surrounding said screen, a fluid foil carried by said rotor to induce a flow of papermaker's stock along said fluid inlet surface of said screen, a first collection channel communicating with said accepts side surface of said screen to collect fluid flowing through said screen, a second collection channel communicating with said fluid inlet surface of said screen to collect fluid that does not flow through said screen, and magnetic bearings operatively associated with said stator and rotor for levitatingly supporting said rotor.

25. A screen as recited in claim 24 wherein said rotor comprises a hollow shaft defining a fluid inlet channel to feed said papermaker's stock to said fluid foil.

26. A screen as recited in claim 25 wherein said fluid foil is integral with said rotor and wherein said fluid foil comprises apertures therein for forwarding said papermaker's stock from said inlet channel to said fluid inlet surface of said screen.

27. A screen as recited in claim 25 wherein said magnetic bearings comprises radial magnetic bearings disposed about said rotor to control radial positioning of said rotor in said stator and said magnetic bearings also comprise axial magnetic bearings disposed along said rotor to control axial positioning of said rotor within said stator.

28. In a method of processing a pulp suspension wherein a rotatable pulp processing component is brought into contact with said pulp, the improvement comprising:

a.) providing a variable speed motor having a stationary member and a rotatable drive member;

b.) combining said rotatable pulp processing component and said rotatable drive member into an integral unit; and

c.) providing bearings along said rotatable pulp processing

component and said rotatable drive member to support said rotatable drive member within said stationary member, and controlling axial and radial movement of said pulp processing component relative to said stationary member by said bearings.

29. Method is recited in claim 28 wherein said bearings are magnetic bearings.

30. Method as recited in claim 29 wherein said variable speed motor is a switched reluctance motor.

31. In a method of processing a pulp suspension wherein a rotatable pulp processing component is brought into contact with said pulp, the improvement comprising

a.) providing a variable speed motor having a stator and a rotor rotatably mounted along a longitudinal axis within said stator;

b.) combining said rotatable pulp processing component and said rotor along a common shaft; and

c.) providing magnetic bearings along said common shaft and said stator to support both said rotatable pulp processing equipment and said rotor and control axial and radial movement of said rotatable pulp processing component relative to said stator.

32. Method as recited in claim 31 wherein said variable speed motor is a switched reluctance motor.

33. Method is recited in claim 32 wherein said shaft is hollow and including the further step of providing a fluid flow through said hollow shaft.

add a2

add c3